Space Weather Forecast

Issued on Sunday, 22 January 2023 at 13:17 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of R1/R2 Radio Blackouts throughout. G1/Minor Geomagnetic Storms likely Day 2 (23rd) and a chance on Day 3 (24th).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low through the past 24 hours, with only Common-class flares observed. There are currently eight sunspot regions on the visible disc. The largest and most complex, situated in the southwest quadrant. Two moderately large and complex regions lie in the southwest and northwest. All other sunspot regions are small, simple and appear to be relatively stable at this time. No Earth-directed Coronal Mass Ejections (CMEs) have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar wind speeds have been elevated to slightly elevated, with a peak 535km/s at 21/1239 UTC, before a gradual decline to near 430km/s by the end of the period. The Interplanetary Magnetic Field (IMF) has been weak, as has the important north-south component of the magnetic field. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate, with a slight chance of reaching High levels. There are numerous candidate regions on the disc for significant flares, however, the most capable regions at this time are the large, complex region in the southwest and the two moderately sized and complex regions, located in the southwest and northwest.

Solar Wind / Geomagnetic Activity: The high-speed stream from a currently geo-effective coronal hole will gradually ease through Day 1 and 2 (22nd and 23rd) with solar winds reducing from slightly enhanced to background levels. Thereafter, a number of CMEs are forecast to potentially affect Earth between Days 2 and 3 (23rd and 24th), but with low-medium confidence in effects and timings. On Day 3, a large equatorial coronal hole is expected to connect with Earth, with speeds of around 550 km/s likely. This continuing into Day 4 (25th). Generally Quiet geomagnetic activity is expected on Day 1 and early Day 2, with Active to G1/Minor storm likely on Days 2 and 3 due to potential CME arrivals and high-speed streams respectively. These effects should start to start to wane Day 4, though with lower than average confidence.

Energetic Particles / Solar Radiation: Solar radiation will most likely remain at background levels, but with a slight chance of enhancements to S1 or greater through the period, in association with any larger flares.

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Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	60	40	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	60	60
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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